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L1: Entry 1 of 1

File: USPT

Jun 6, 2000

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TITLE: Chimeric isoprenoid synthases and uses thereof

DATE-ISSUED: June 6, 2000

INVENTOR-INFORMATION:

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US-CL-CURRENT: 536/23.1; 435/69.1, 435/69.7, 435/71.1, 536/23.4

CLAIMS:

What is claimed is.

1. A nucleic acid molecule encoding a chimeric isoprenoid synthase polypeptide that comprises an asymmetrically positioned homologous domain and that catalyzes the production of isoprenoid reaction products that are not produced when said domain is positioned at its naturally-occurring site in an isoprenoid synthase polypeptide.
2. The nucleic acid molecule of claim 1 carried on a vector.
3. The nucleic acid molecule of claim 2, wherein said vector additionally comprises a control sequence operably linked to said nucleic acid molecule.
4. The nucleic acid molecule of claim 3, wherein said control sequence initiates transcription of said nucleic acid molecule.
5. The nucleic acid molecule of claim 3, wherein said control sequence further comprises a signal sequence that effects secretion of said chimeric isoprenoid synthase polypeptide.
6. A cell comprising the nucleic acid molecule of claim 1.
7. The cell of claim 6, wherein said cell is a yeast cell.
8. The cell of claim 6, wherein said cell is E. coli.
9. The cell of claim 6, wherein said cell expresses said chimeric isoprenoid synthase polypeptide.
10. The cell of claim 6, wherein said cell secretes said chimeric isoprenoid synthase polypeptide.

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L2: Entry 1 of 1

File: USPT

Oct 20, 1998

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TITLE: Chimeric isoprenoid synthases and uses thereof

DATE-ISSUED: October 20, 1998

INVENTOR-INFORMATION:

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530/376, 530/377, 530/378, 530/379, 536/23.1, 536/23.4, 536/23.6, 536/23.74

CLAIMS:

We claim:

1. A chimeric isoprenoid synthase polypeptide comprising a domain from a first isoprenoid synthase joined to a domain from a second, different isoprenoid synthase, whereby said chimeric isoprenoid synthase polypeptide catalyzes the production of an isoprenoid reaction product that is not produced in the absence of said domain from said second, different isoprenoid synthase, wherein:

(a) said first isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said first isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said second, different isoprenoid synthase;

(b) said second, different isoprenoid synthase catalyzes the production of an isoprenoid reaction product of said second different isoprenoid synthase, but does not catalyze the production of an isoprenoid reaction product of said first isoprenoid synthase;

(c) said domain from said first isoprenoid synthase occupies a first position in said chimeric isoprenoid synthase polypeptide, said first position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said first isoprenoid synthase occupied by said domain from said first isoprenoid synthase; and

(d) said domain from said second, different isoprenoid synthase occupies a second position in said chimeric isoprenoid synthase polypeptide, said second position in said chimeric isoprenoid synthase polypeptide corresponding to a position in said second, different isoprenoid synthase occupied by said domain from said second, different isoprenoid synthase.

2. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said chimeric isoprenoid synthase polypeptide catalyzes at least two different isoprenoid reaction products.

3. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said domain from said second, different isoprenoid synthase comprises a ratio determinant domain of said chimeric isoprenoid synthase polypeptide.

4. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said domain from said first isoprenoid synthase is from a plant isoprenoid synthase and said domain from said second, different isoprenoid synthase is from a plant isoprenoid synthase.
5. The chimeric isoprenoid synthase polypeptide of claim 4, wherein said chimeric isoprenoid synthase polypeptide is chosen from the group consisting of (a) the tobacco-Hyoscyamus CH4 chimeric isoprenoid synthase; (b) the tobacco-Hyoscyamus CH10 chimeric isoprenoid synthase; (c) the tobacco-Hyoscyamus CH11 chimeric isoprenoid synthase; (d) the tobacco-Hyoscyamus CH12 chimeric isoprenoid synthase; (e) the tobacco-Hyoscyamus CH13 chimeric isoprenoid synthase; and (f) the tobacco-Hyoscyamus CH14 chimeric isoprenoid synthase.
6. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antifungal agent.
7. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antibacterial agent.
8. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said chimeric isoprenoid synthase polypeptide catalyzes the production of an antitumor agent.
9. DNA encoding a chimeric isoprenoid synthase polypeptide of claim 1.
10. A vector containing the DNA of claim 9.
11. A cell containing the DNA of claim 9.
12. The cell of claim 11, wherein said cell is *E. coli*.
13. A chimeric isoprenoid synthase polypeptide comprising an asymmetrically positioned homologous domain, whereby said chimeric isoprenoid synthase polypeptide catalyzes the production of isoprenoid reaction products that are not produced when said domain is positioned at its naturally-occurring site in an isoprenoid synthase polypeptide.
14. A method for producing a chimeric isoprenoid synthase polypeptide, said method comprising:
 - (a) providing a cell transformed with the DNA of claim 9 positioned for expression in said cell;
 - (b) culturing said transformed cell under conditions for expressing said DNA; and
 - (c) recovering said chimeric isoprenoid synthase polypeptide.
15. The chimeric isoprenoid synthase polypeptide of claim 3, wherein said ratio-determinant domain of said chimeric isoprenoid synthase polypeptide determines the ratio of isoprenoid reaction products of said chimeric isoprenoid synthase polypeptide.
16. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said domain from said second, different isoprenoid synthase comprises a region encoded by exon 4 of said second, different isoprenoid synthase.
17. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said domain from said second, different isoprenoid synthase comprises a region encoded by exon 5 of said second, different isoprenoid synthase.
18. The chimeric isoprenoid synthase polypeptide of claim 1, wherein said domain from said second, different isoprenoid synthase comprises a region encoded by exon 6 of said second, different isoprenoid synthase.